

STANDARD FORM NO. 64

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*Office Memorandum* • UNITED STATES GOVERNMENT

TO : The Files (R&amp;D Branch)

DATE: 19 June 1957

FROM 

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SUBJECT: Summary of Test Data of the RP-11 AC Power Supply

1. An engineering model of the miniature RP-11 Power Supply was received from the  for Laboratory evaluation. The unit consists of an input power transformer and associated rectifier and filter sections mounted in a small aluminum case. The circuitry is conventional with two full wave sections designed to supply the input power requirements of the RS/A-11 Radio Set.

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2. Tests were conducted using the RP-11 AC power unit to supply the operating voltages to a prototype RS/A-11 Radio Set. The RS/A-11 Radio Set composed of the RT/A-11 transmitter and RR/A-11 receiver were connected for simplex operation. From these tests, the following information is derived:

a) Size and Weight

Size: 7-3/8" x 3-1/2" x 1-1/8"

Weight: 3 pounds, 4 ounces

b) AC Ripple

The AC ripple on the B plus output of the power supply was measured with the transmitter on, key down, and is 2.09%. The presence of RF is noted on the filament line (A plus terminal).

c) Voltage Regulation

The AC input was adjusted at the specified tap to 120 volts, 60 cycles. The key up - key down voltage regulation measured in the transmit position is 26.3%.

d) 400 Cycle Operation

With the AC input set at 120 volts, the RP-11 power supply provided the following operating voltages for the RS/A-11 Radio Set:

Transmit Position (Key Down):

AC power input - 32 watts

"A" plus voltage and current - 2.12 volts/850 ma

plus voltage and current - 189 volts/82 ma

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Receive Position:

"A" plus voltage and current - 1.45 volts/390 ma

"B" plus voltage and current - 115 volts/13 ma

e) Power Input and Operating Voltage of the RP-11 AC Power Supply

In the following test, the AC line voltage was set to provide the specified voltage requirements of the input power transformer primary taps - 70, 95, 120, 150, 190, 230, and 270 volts.

Transmit Position (Key Down):

AC input - 47 watts at 6 mc, RF power output-6.4 watts

"A" plus voltage and current - 2.29 volts/890 ma

"B" plus voltage and current - 211 volts/97.1 ma

Receive Position:

AC input - 19.9 watts

"A" plus voltage and current - 1.55 volts/395.5 ma

"B" plus voltage and current - 122 volts/13.4 ma

These figures are averaged from all tap readings.

f) Adjusted Power Input and Operating Voltages of the RP-11 AC Power Supply 60 Cycles

In this test, the AC line voltage input was varied at the specified input line taps to provide a 220 volts DC input to the RT/A-11 transmitter. Voltage and current readings were taken and averaged for all transformer tap positions.

Transmit Position (Key Down):

AC input - 52 watts at 6 mc, RF output - 6.8 watts

"A" plus voltage and current - 2.345 volts/893 ma

"B" plus voltage and current - 220 volts/99 ma

Receive Position:

AC input - 21.5 watts

"A" plus voltage and current - 1.65 volts/418 ma

"B" plus voltage and current - 128 volts/14 ma

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- g) The AC line variation in volts from the specified input tap is as follows:

Specified Line Tap Input Power Transformer	Required AC Input to Obtain 220 Volts DC
70	73
95	99
120	124
150	154
190	195
230	236
270	277

- h) Adjusted AC Input and Operating Voltages of the RP-11 AC Power Supply 400 Cycle Operation

This test was conducted under test conditions outlined in (f) with the exception that the AC input was 400 cycles. The operating voltages in the receive and transmit key-down position and the AC line voltage input required to produce a 220 volts DC output were recorded.

Specified Line Tap Input Power Transformer	AC Input Required to Obtain 220 Volts DC
70	87.5
95	117.5
120	139
150	183
190	226
230	269
270 not taken due to lack of instruments	

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## Receive-Transmit (Key Down) Operating Voltages

Specified Line Tap Input Power Transformer	Receiver Voltages		Transmitter Voltages	
	Fils.	B Plus	Fils	B Plus
70	1.82	138	2.45	220
95	1.82	135	2.43	220
120	1.76	134	2.39	220
150*	3.00	146	2.79	220
190	3.00	148	2.79	220
230	3.00	148	2.80	220
270				

\* During the above test, one of the Transatron TM-1 silicon rectifiers in the RP-11 filament rectifier circuit failed. No replacement is immediately available.

## 3. Conclusions and Recommendations:

The RP-11 AC power supply performed well during the evaluation tests, except as noted below. Good features include design, size, weight, and form factor. Features recommended to be modified include:

- a) The power unit case should be made more rugged to withstand normal shock and jarring. The AC input cover and rotating tap selector should be constructed of more durable material such as bakelite or nylon.
- b) During tests, the power unit case became extremely warm. It is recommended that holes be perforated in the unit case to afford some ventilation of the heated components.
- c) The RF present on the RT/A-11 transmitter filament lead (A plus terminal) should be adequately bypassed to ground.
- d) The power supply filament voltage for receiver operation is higher (1.55 volts) than the tube manufacturers rating (1.25 volts) and should be reduced to protect tube life.
- e) The power supply "B" voltage is lower than the recommended 220 volts DC for transmitter key-down operation.
- f) The turns on the input power transformer should be adjusted to correct (e) and, also, to provide an even spread of the nominal AC voltages that may be applied to the input transformer.

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- g) It is recommended that an additional fuse be incorporated in the primary center tap to protect the transformer with AC inputs at the higher tap positions.
- h) The operating voltages obtained from the power unit during 400 cycle operation were low.

Example: "A" voltage and current, 120 volt tap -  
2.12 volts/850 ma  
"B" voltage and current, 120 volt tap -  
189 volts/82 ma

These measurements were made in the transmit position, key-down.



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